RUSI/CGP Conference

C4ISR Enterprise and MC2C …
Complementary Enablers for C4ISR Integration!

"Commanding Air and Space Power"

U.S. AIR FORCE

Colonel "Stormin' Norman" Sweet
Chief, C2 Enterprise Planning and Integration Div
Deputy SPD, Multi-Sensor C2 Constellation
23-25 September 2002
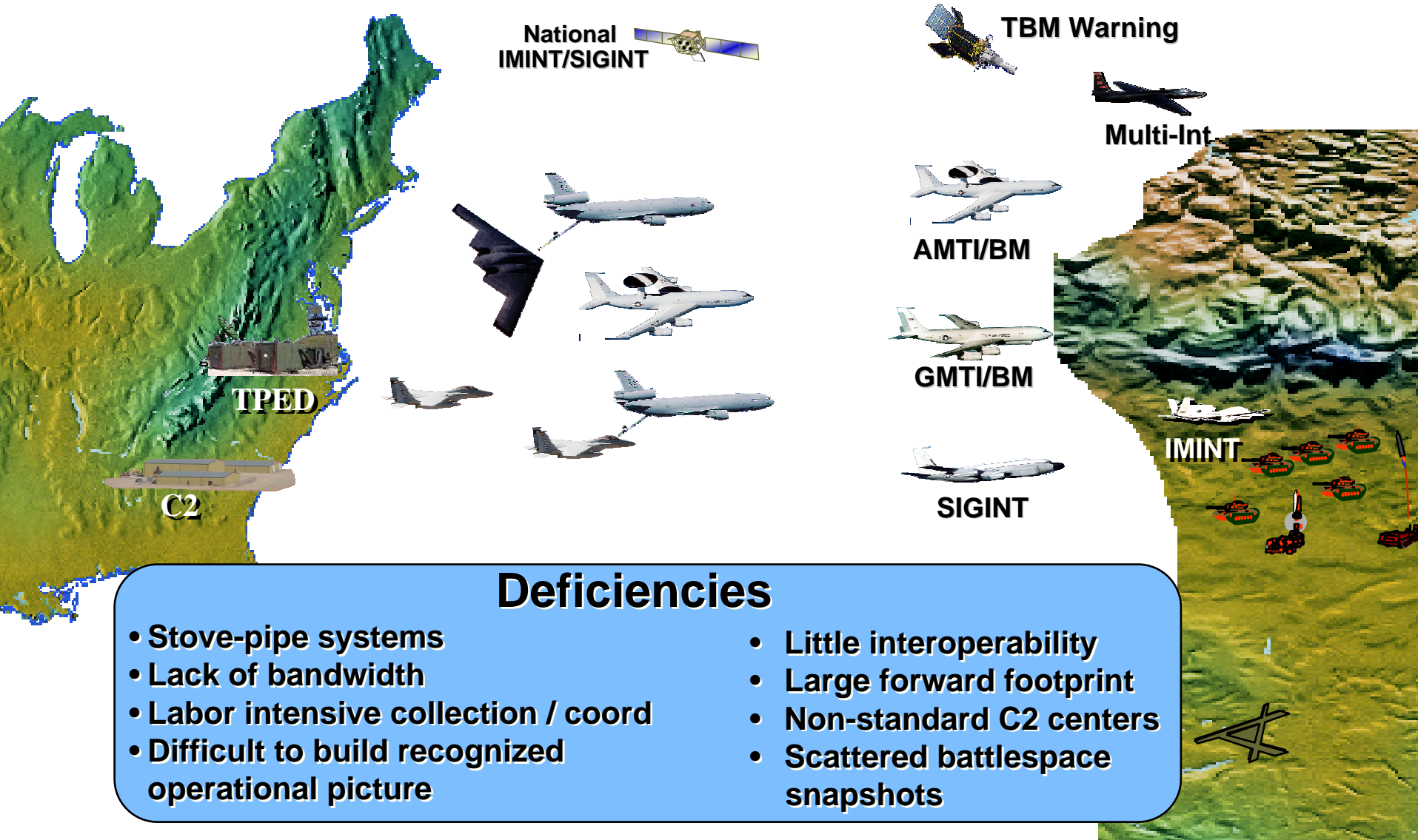**DSN 478-6420, 781-377-6420**
Norm.Sweet@hanscom.af.mil

Integrity - Service - Excellence

Report Documentation Page	*Form Approved* *OMB No. 0704-0188*

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Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std Z39-18

Agenda

- **Operational Reality / Integration Challenge**

- **Air Force Integration Initiatives**
    - **Air Staff (AF/XI)**
    - **Air Force Materiel Command**
    - **Electronic Systems Center**
    - **C4ISR Enterprise Integration Office**

- **Multi-Sensor Command and Control Constellation (MC2C) Program**
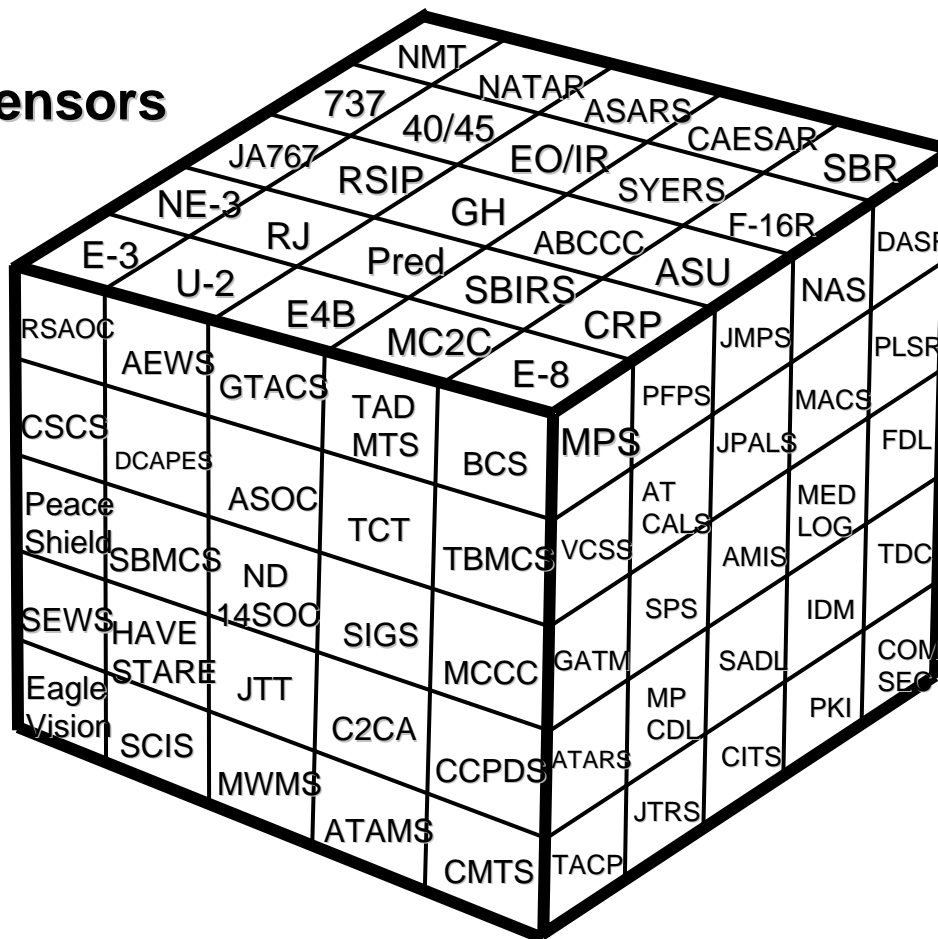
Today's Operational Reality

National IMINT/SIGINT

TBM Warning

Multi-Int

AMTI/BM

GMTI/BM

TPED

C2

SIGINT

IMINT

Deficiencies

- Stove-pipe systems
- Lack of bandwidth
- Labor intensive collection / coord
- Difficult to build recognized operational picture

- Little interoperability
- Large forward footprint
- Non-standard C2 centers
- Scattered battlespace snapshots

"Data Overloaded, Information Starved"
Scientific Advisory Board (SAB)

C4ISR Integration "The Challenge"

Platforms, Sensors

Grd Stations & BMC3

Common Integrated Infrastructure
- **Comm**
- **GATM**
- **Mission Planning**
- **Force Protection**

Cube labels (Platforms, Sensors): NMT, 737, NATAR, ASARS, JA767, 40/45, EO/IR, CAESAR, SBR, NE-3, RSIP, SYERS, F-16R, E-3, RJ, GH, ABCCC, ASU, DASP, U-2, Pred, SBIRS, CRP, NAS

Cube labels (Grd Stations & BMC3): RSAOC, AEWS, GTACS, MC2C, E-8, JMPS, PLSR, CSCS, TAD MTS, PFPS, MACS, DCAPES, BCS, MPS, JPALS, FDL, Peace Shield, ASOC, TCT, AT CALS, AMIS, MED LOG, TDC, SBMCS, ND 14SOC, TBMCS, VCSS, SPS, IDM, SEWS, HAVE STARE, SIGS, GATM, SADL, COM SEC, Eagle Vision, JTT, MCCC, MP CDL, PKI, CITS, SCIS, C2CA, ATARS, JTRS, MWMS, CCPDS, ATAMS, TACP, CMTS


Different Mixes for Different Task Forces
"Overarching Systems Engineering Required"

Welcome to C4ISR/Integration

- **Everyone loves integration as long as you integrate with me.**

- **I provide a product and my job is done (but someone else's is just beginning).**

- **Sometimes 4 pieces of information is worse than 1.**

- **Knowing it's coming doesn't help if it's a Tsunami.**

- **Operational Test & Evaluation (OT&E) doesn't occur until it's operating.**
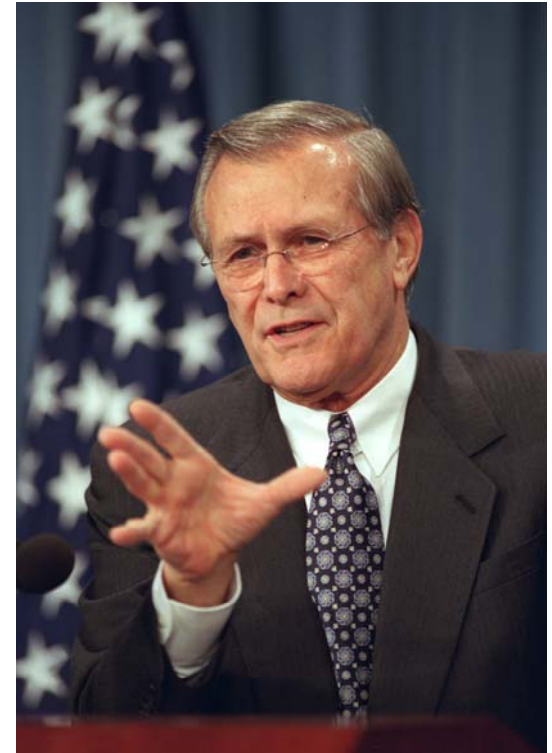
Systems-of-Systems Complexity Makes it Hard
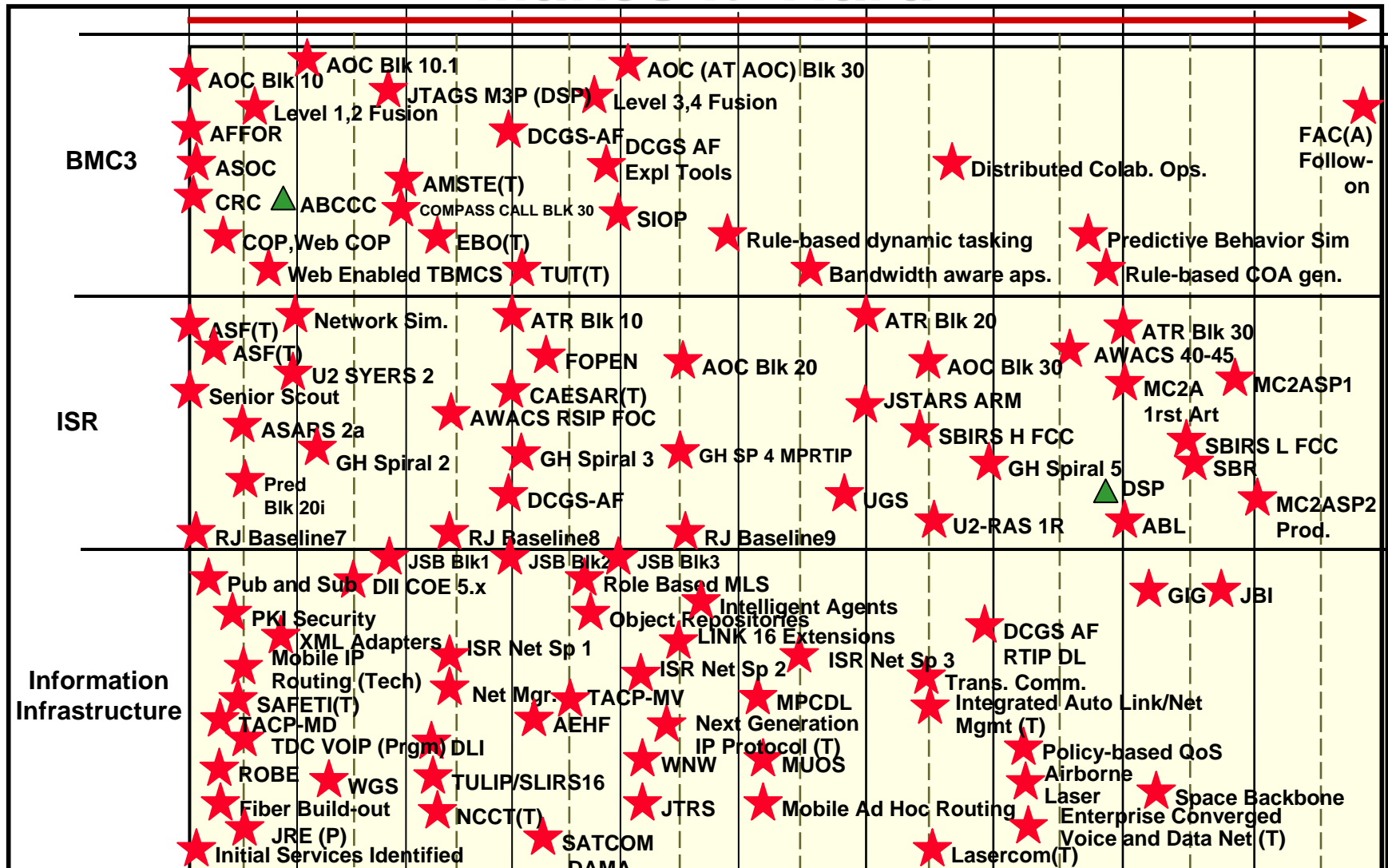
Required: *An Integrated C4ISR EI Master Plan*

DoD Transformation

- **DOD Goal: Dominating Air, Sea and Land Battlespace**

- **C4ISR Integration one of SECDEF's Top 5 Priorities**

- **SECAF and CSAF are committed to transforming USAF and achieving warfighting integration**

"The development and deployment of a truly modern and effective command, control, communication, and intelligence system is fundamental to the transformation of the US military forces …. "
— Secretary of Defense Donald Rumsfeld

SECAF and CSAF on Warfighting Integration

DR. JAMES G. ROCHE
Secretary of the Air Force

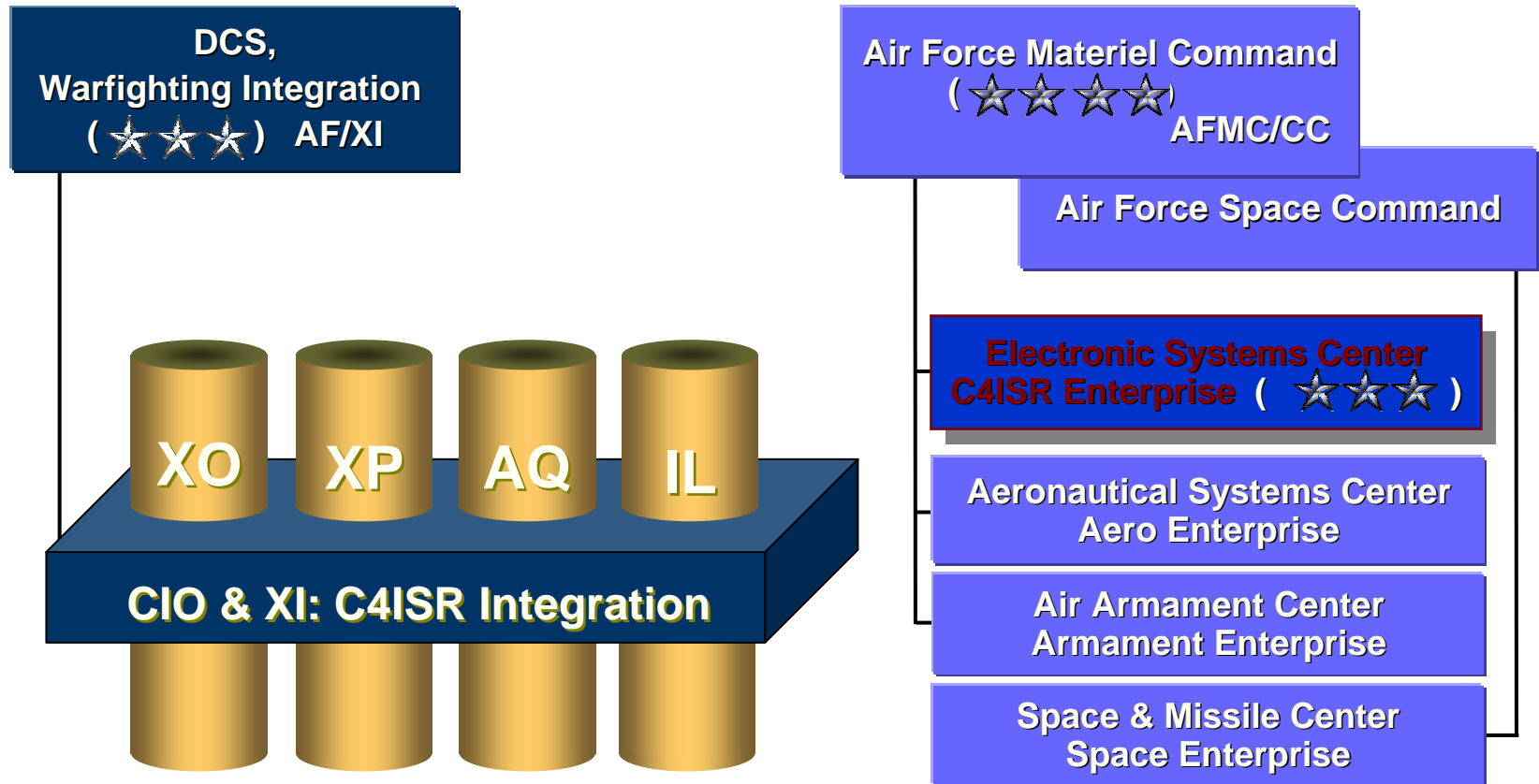**GENERAL JOHN P. JUMPER**
Chief of Staff of the Air Force

"These changes will best posture the Air Force to enhance our contribution to national security by exploiting the synergies within C4ISR capabilities"

"Successful operations depend on modernized air and space capabilities to quickly find, fix, track and attack targets..."

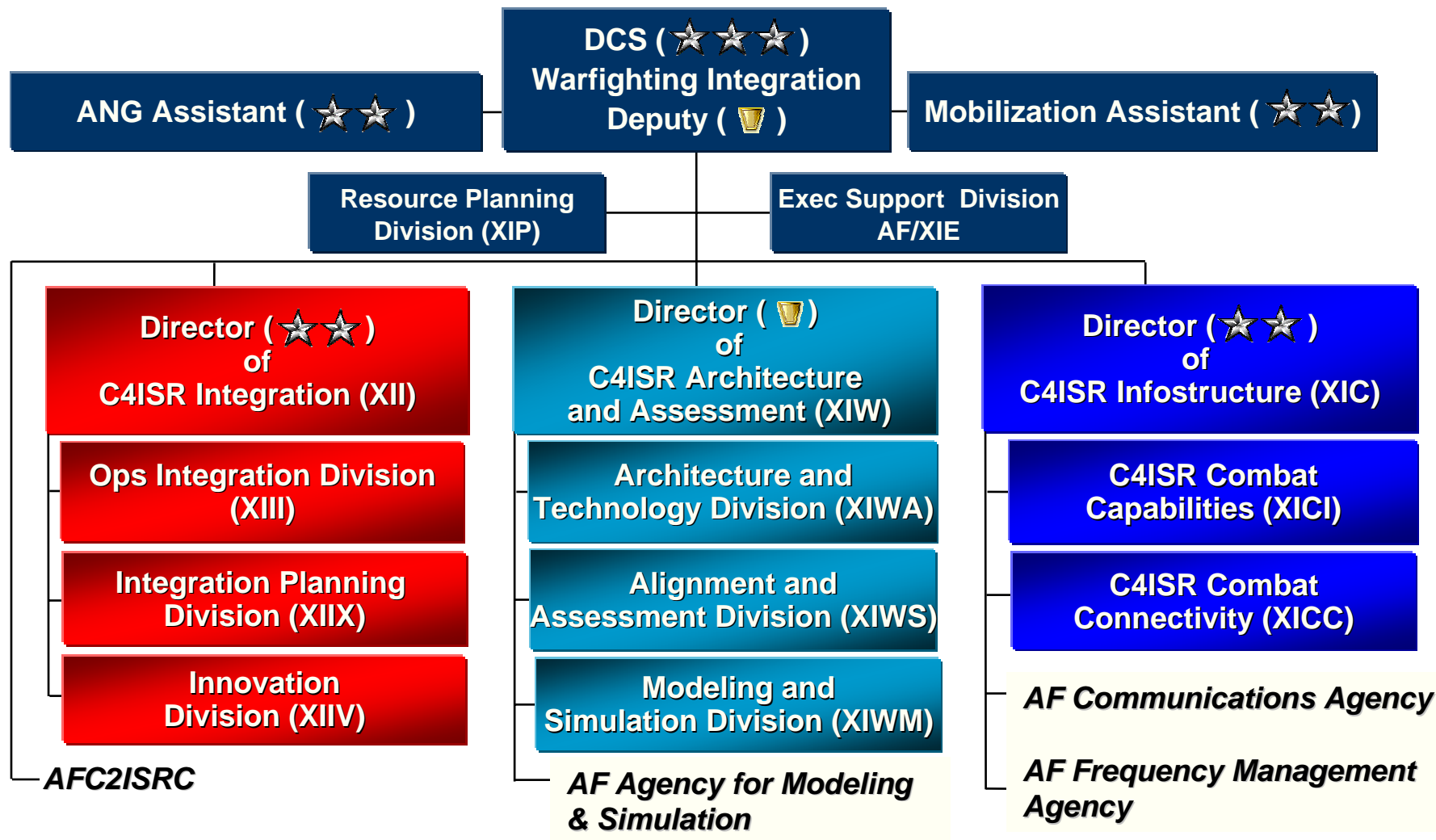# AF Organizations Engaged in C4ISR Integration

DCS, Warfighting Integration (★★★) AF/XI

Air Force Materiel Command (★★★★) AFMC/CC

Air Force Space Command

XO **XP** **AQ** **IL**

CIO & XI: C4ISR Integration

Electronic Systems Center C4ISR Enterprise (★★★)

Aeronautical Systems Center Aero Enterprise

Air Armament Center Armament Enterprise

Space & Missile Center Space Enterprise

Mission: *Close the seams in the process between Find, Fix, Track, Target, Engage, and Assess by integration of manned, unmanned, and space systems*

AF/XI Organization
Warfighting Integration

DCS (⭐⭐⭐)
Warfighting Integration
Deputy (🎖)

ANG Assistant (⭐⭐)

Mobilization Assistant (⭐⭐)

Resource Planning Division (XIP)

Exec Support Division AF/XIE

Director (⭐⭐) of C4ISR Integration (XII)

Director (🎖) of C4ISR Architecture and Assessment (XIW)

Director (⭐⭐) of C4ISR Infostructure (XIC)

Ops Integration Division (XIII)

Architecture and Technology Division (XIWA)

C4ISR Combat Capabilities (XICI)

Integration Planning Division (XIIX)

Alignment and Assessment Division (XIWS)

C4ISR Combat Connectivity (XICC)

Innovation Division (XIIV)

Modeling and Simulation Division (XIWM)

AFC2ISRC

AF Agency for Modeling & Simulation

AF Communications Agency

AF Frequency Management Agency

AF / XI Initial Priorities

- **Produce way ahead for integrated C4ISR modernization**
  - **Develop roadmaps grounded in an architecture of integrated operational, system, and technical views**
  - **Enable integrated C4ISR operations via a robust comm infostructure**

- **Enhance the integration of air and space ISR capabilities**
  - **Key focus areas: AOC, MC2C, & DCGS**

- **Produce a modeling and simulation capability for C4ISR**
  - **An AF-wide network shared for development, acquisition, training, and operations**

- **Work with Services, National and Joint communities to enhance end-to-end integration / interoperability**

AFMC Enterprise Approach
Vision: Technology, Innovation, Interoperability for the Warfighter

Aeronautical

Armament

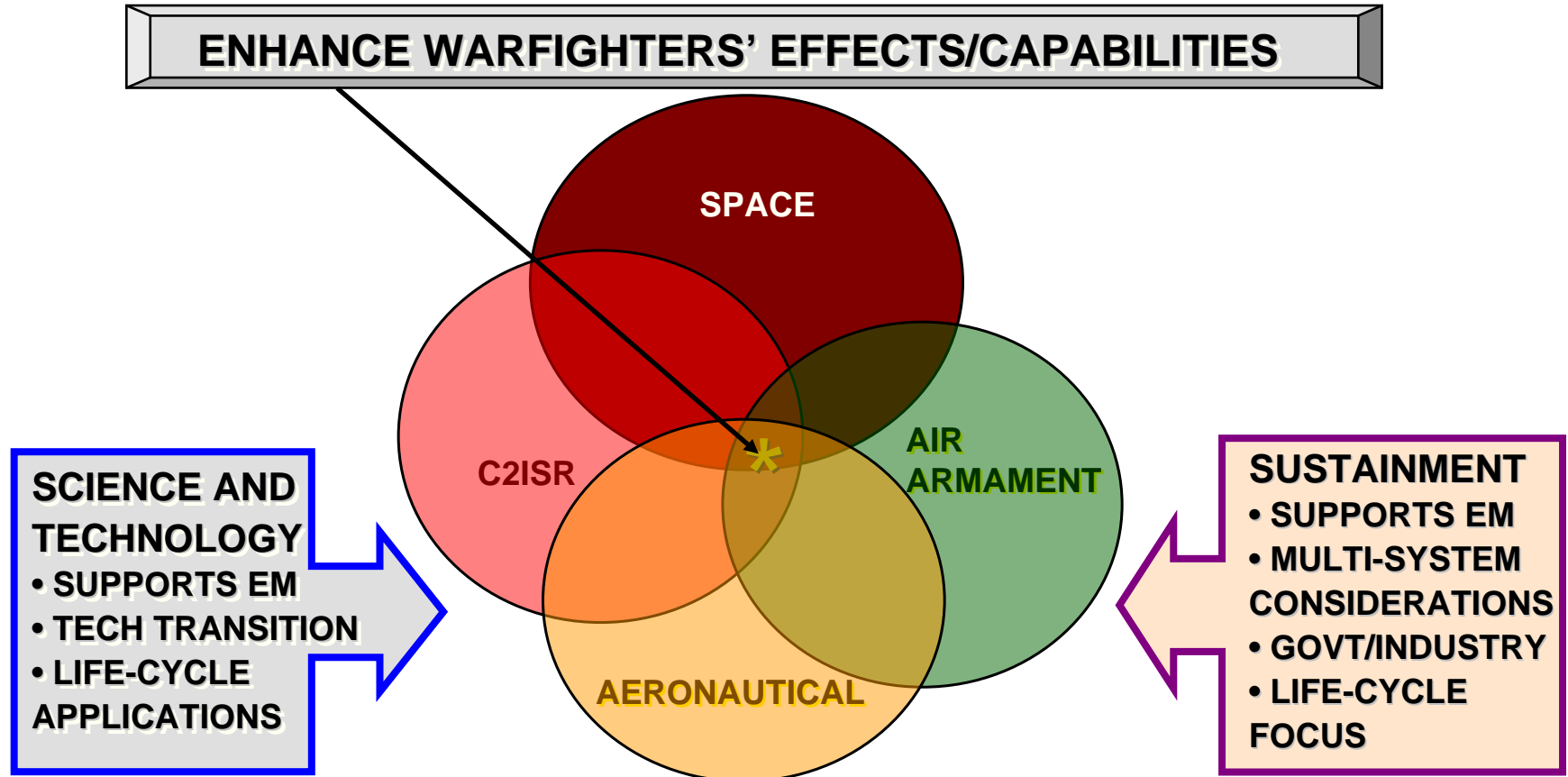Command & Control

Space
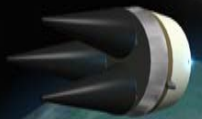
A More Effective Fighting Force

Capabilities To User

AWACS

JSTARS

U-2

RJ

Predator

Satellites

Shooters

Reachback

GTACS

Target

AOC

TPEDS

C4 is "cross-cutting" to all of these systems ("horizontally")
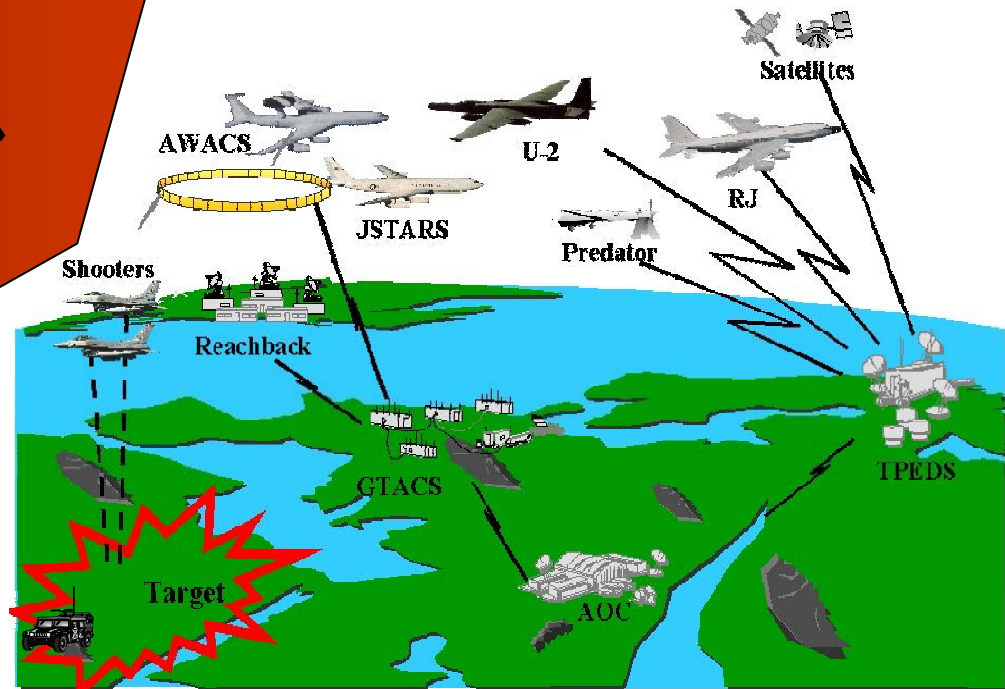
Enterprise Management
The Construct

ENHANCE WARFIGHTERS' EFFECTS/CAPABILITIES

SPACE

C2ISR

AIR ARMAMENT

AERONAUTICAL

SCIENCE AND TECHNOLOGY
- SUPPORTS EM
- TECH TRANSITION
- LIFE-CYCLE APPLICATIONS

SUSTAINMENT
- SUPPORTS EM
- MULTI-SYSTEM CONSIDERATIONS
- GOVT/INDUSTRY
- LIFE-CYCLE FOCUS

Total Team Effort: Warfighters - PEOs/DACs - EM CCs - ALCs - Test Ctrs - Labs - Industry - Academia - Air Staff

AFMC Enterprise Commanders' Responsibilities

- **Lead the Integration within and across Enterprise**

- **Develop Integration Guidance**

- **Lead Integration Planning and Identification of Required Resources**

- **Ensure Enterprise Systems are Integrated and Interoperable**

- **Ensure Integration Guidance is included in PMDs**

- **Work w/ MAJCOMs to Acquire Appropriate Funding**

- **Track, Assess, and Report Integration Progress**

- **Conduct Enterprise Level Awareness Sessions**

Building to the Future…
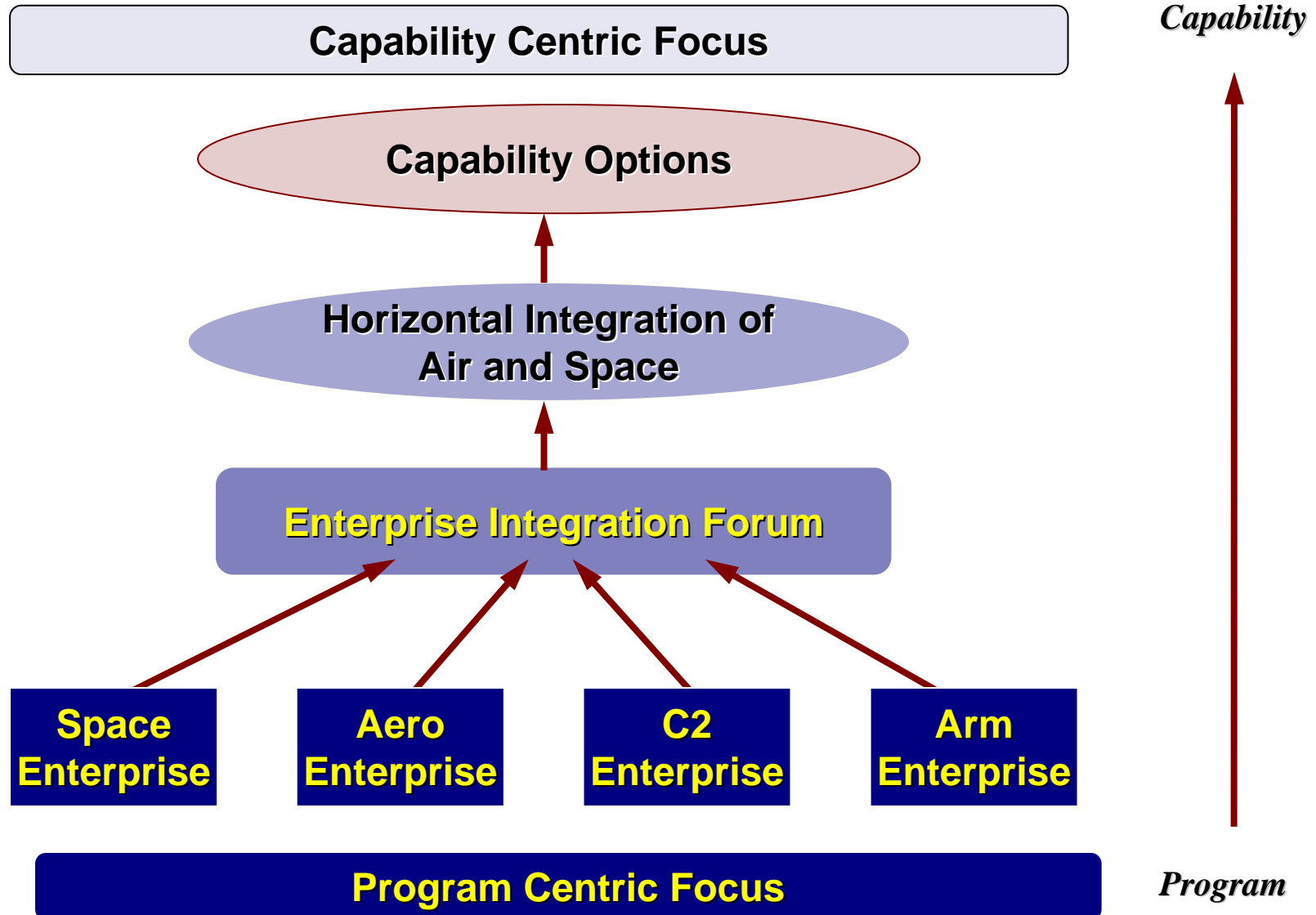
Inter-Enterprise Focus
– *Combat Capability* –

Integrated Solutions

Sensor to Shooter in 1 minute

Results
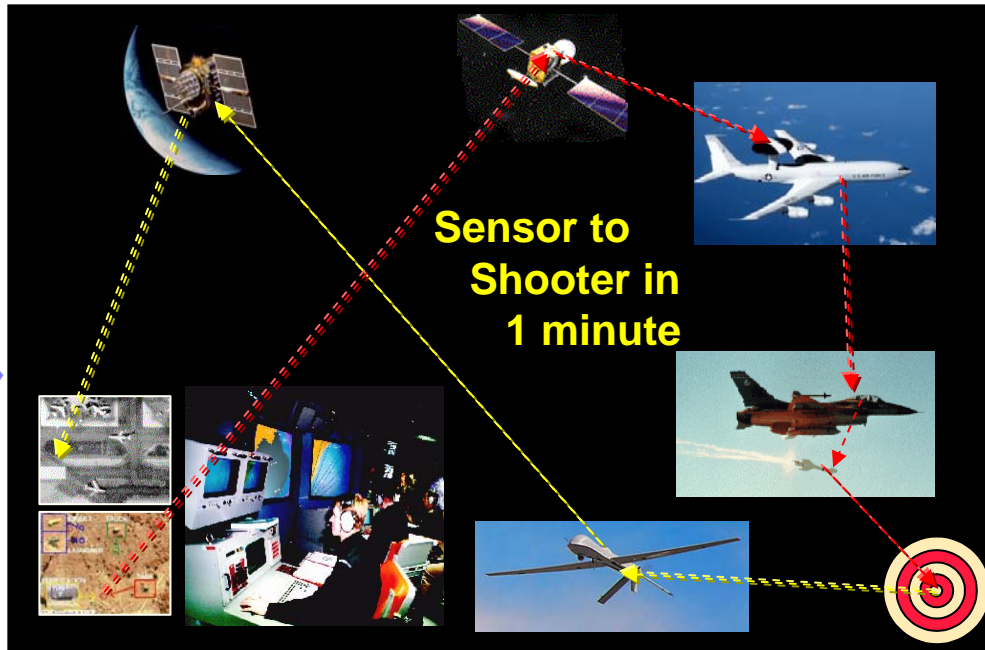
Aeronautical

C2

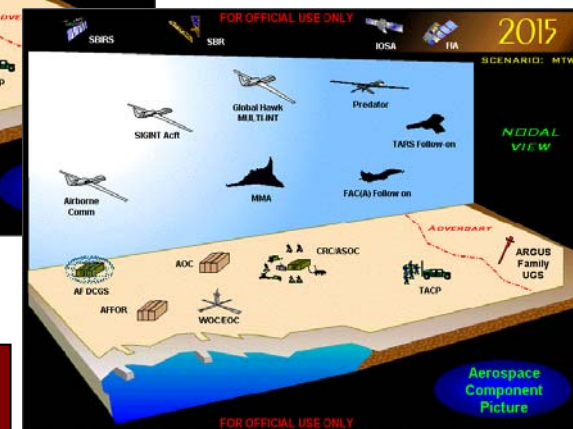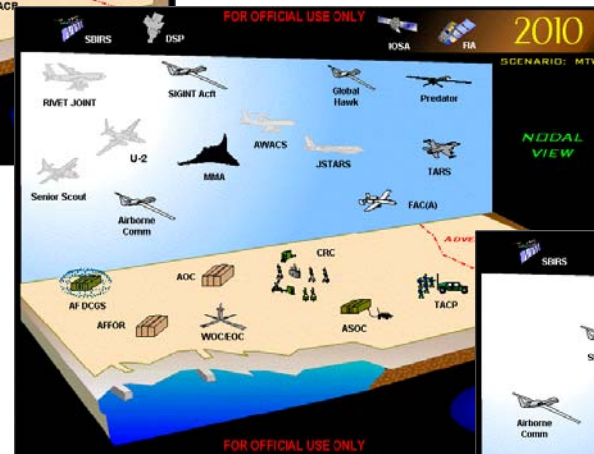*Enterprise Integration Council*
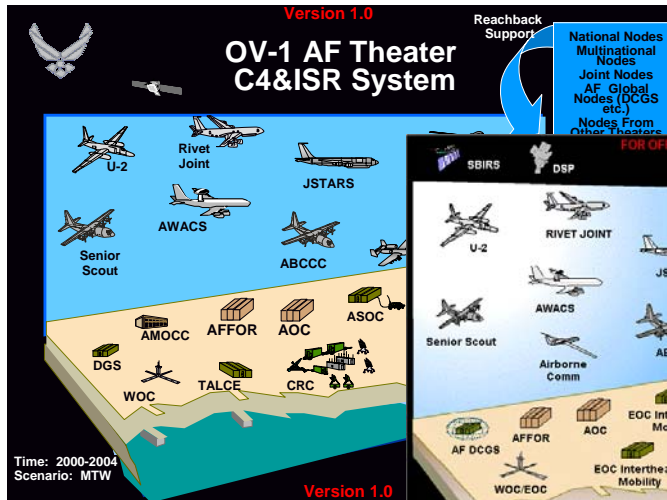
Air Armament

Space/Missile

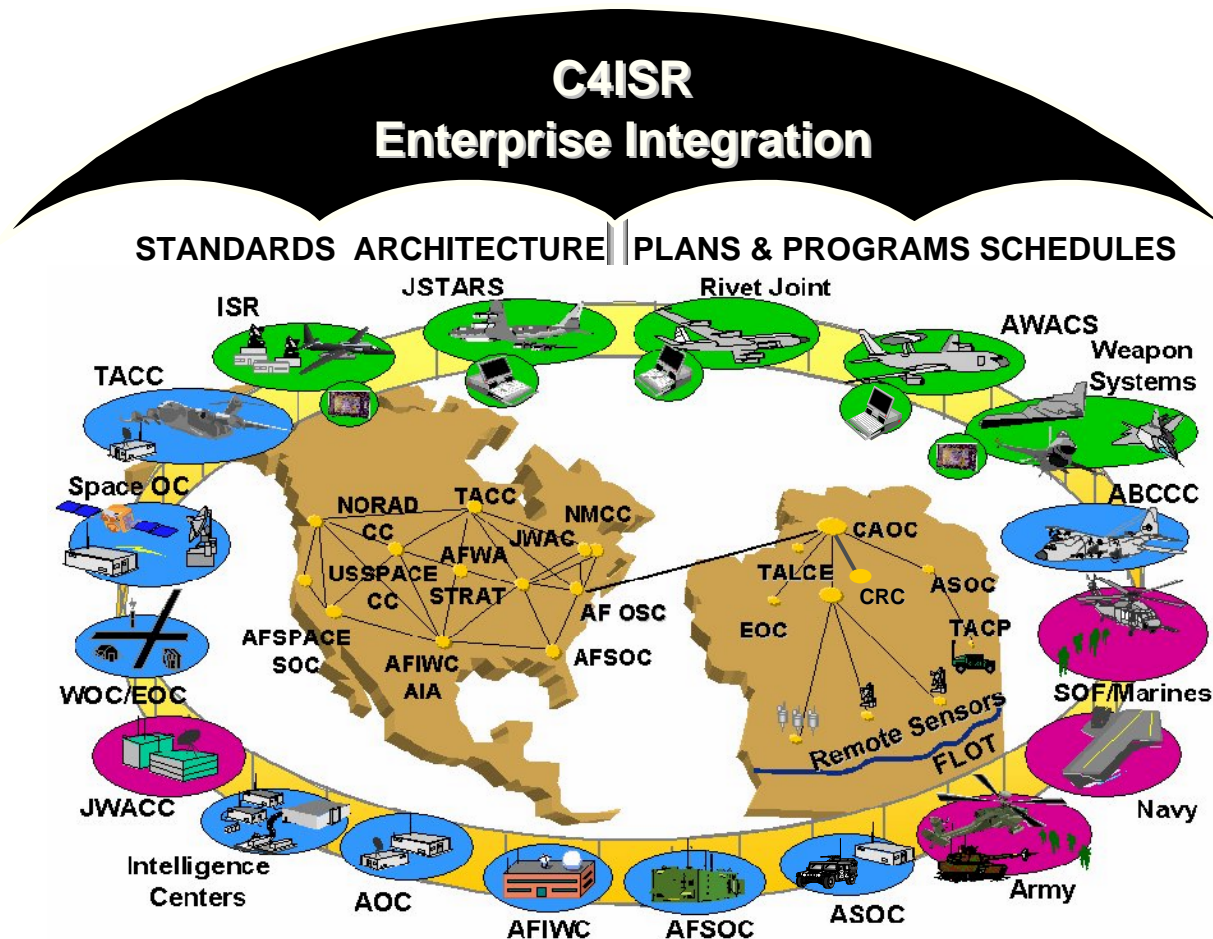# ESC/CX: C4ISR Enterprise Integration Office "Change Agent"

Mission

Lead the
Integration, Development,
Certification, Deployment &
Sustainment

of the
Air Force,
Joint, and Alliance
C4ISR Enterprise System

Lead and enable the _transformation_ and _cultural change_ for integrating AF C4ISR Systems

Managing AF C4ISR Integration

C4ISR Enterprise Integration

STANDARDS ARCHITECTURE PLANS & PROGRAMS SCHEDULES

ESC/CX appointed as Deputy Commander for Enterprise Integration
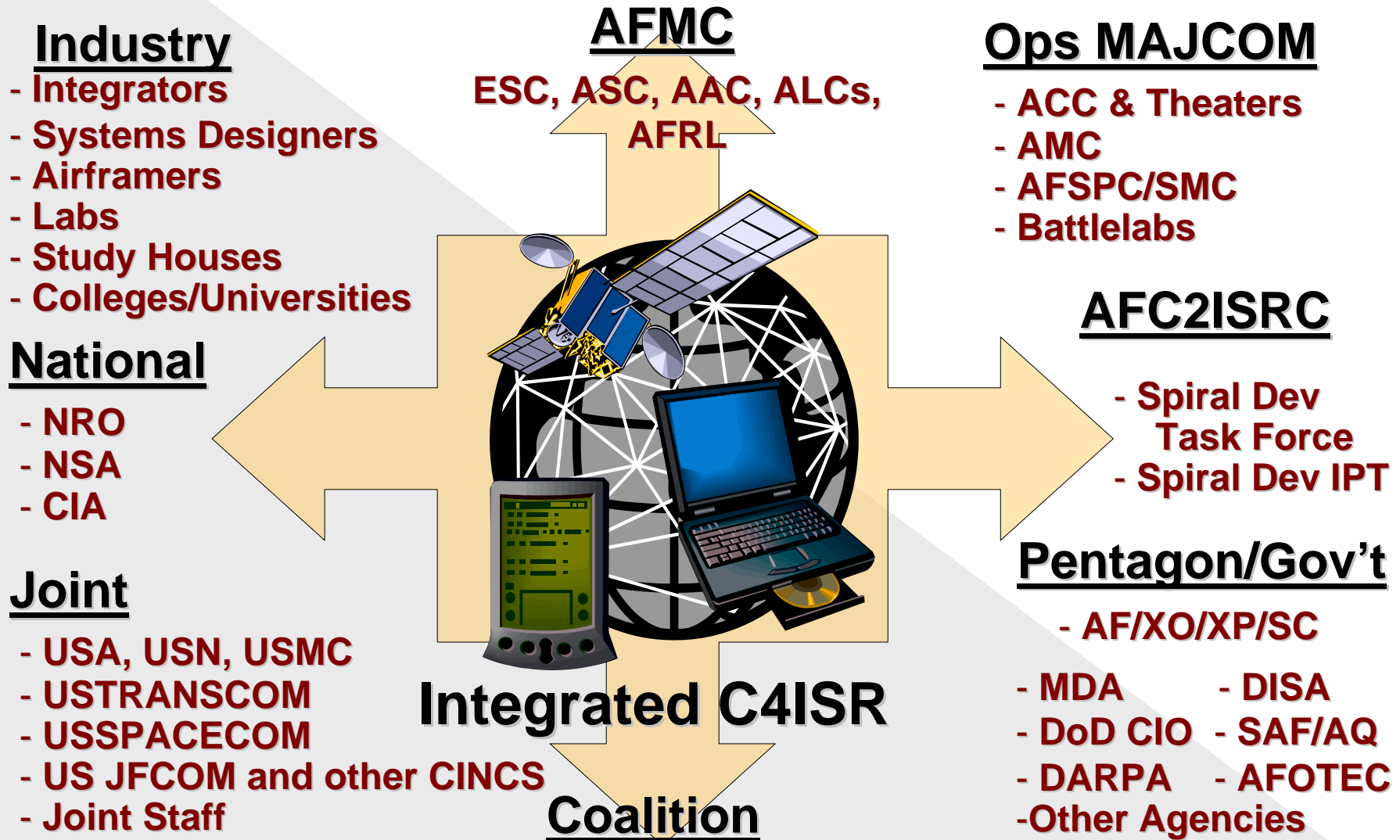
ESC/CX appointed as System Program Director, MC2C

Capability/Node Managers deliver capability to the warfighter

ESC/DI, Defense Information Infrastructure Office established to Develop Common Integrated Infrastructure & Technical Standards
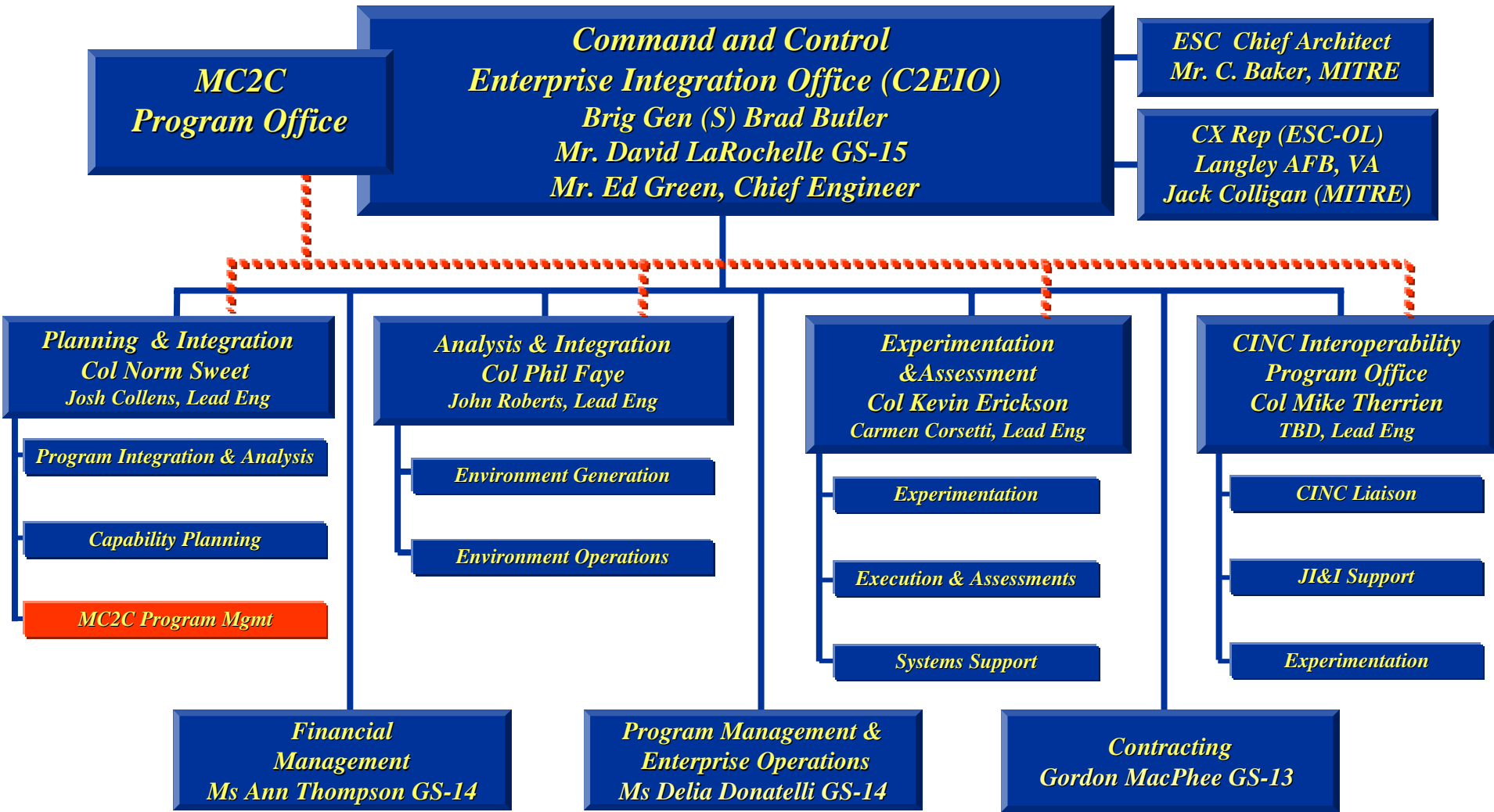
Common Integrated Infrastructure (CII)

Common Operator & Developer Framework
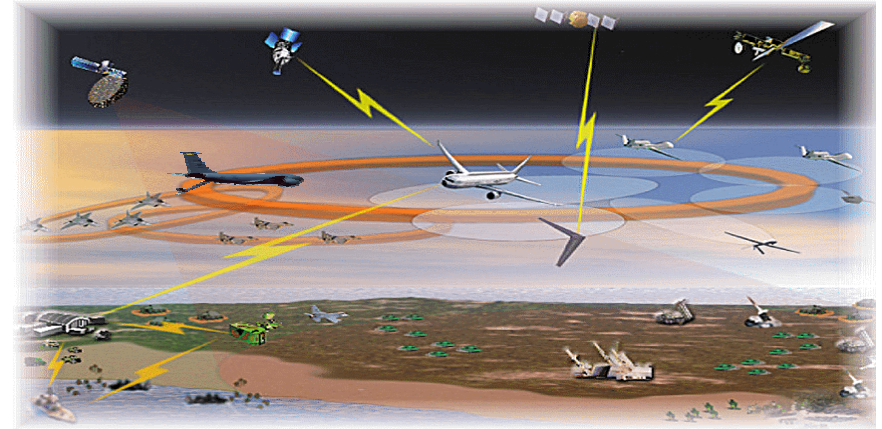
Partnering for C4ISR Enterprise

Industry
- **Integrators**
- **Systems Designers**
- **Airframers**
- **Labs**
- **Study Houses**
- **Colleges/Universities**

AFMC

ESC, ASC, AAC, ALCs, AFRL

Ops MAJCOM
- **ACC & Theaters**
- **AMC**
- **AFSPC/SMC**
- **Battlelabs**

National
- **NRO**
- **NSA**
- **CIA**

AFC2ISRC
- **Spiral Dev Task Force**
- **Spiral Dev IPT**

Joint
- **USA, USN, USMC**
- **USTRANSCOM**
- **USSPACECOM**
- **US JFCOM and other CINCS**
- **Joint Staff**

Integrated C4ISR

Coalition

Pentagon/Gov't
- **AF/XO/XP/SC**
- **MDA**   **- DISA**
- **DoD CIO - SAF/AQ**
- **DARPA   - AFOTEC**
- **Other Agencies**

ESC/CX Organization

MC2C Program Office

Command and Control Enterprise Integration Office (C2EIO)
Brig Gen (S) Brad Butler
Mr. David LaRochelle GS-15
Mr. Ed Green, Chief Engineer

ESC Chief Architect
Mr. C. Baker, MITRE

CX Rep (ESC-OL)
Langley AFB, VA
Jack Colligan (MITRE)

Planning & Integration
Col Norm Sweet
Josh Collens, Lead Eng

- Program Integration & Analysis
- Capability Planning
- MC2C Program Mgmt

Analysis & Integration
Col Phil Faye
John Roberts, Lead Eng

- Environment Generation
- Environment Operations

Experimentation &Assessment
Col Kevin Erickson
Carmen Corsetti, Lead Eng

- Experimentation
- Execution & Assessments
- Systems Support

CINC Interoperability Program Office
Col Mike Therrien
TBD, Lead Eng

- CINC Liaison
- JI&I Support
- Experimentation

Financial Management
Ms Ann Thompson GS-14

Program Management & Enterprise Operations
Ms Delia Donatelli GS-14

Contracting
Gordon MacPhee GS-13

MC2C Defined

- **The MC2C is a:**
  - **Network-Centric**
  - **Peer-Based**
  - **Family of Systems**

- **Providing a decision-quality information exchange environment, with capabilities fielded on**
  - **Modernized Legacy C2ISR Systems**
  - **New Commercially Derived Manned Aircraft (MC2A)**
  - **Unmanned Aerial Vehicles (UAVs)**
  - **Space-Based Systems**
  - **Supporting Ground C2 & Nodes**

Air Force Horizontally Integrated C2ISR Vision

Multi-Sensor C2 Constellation (MC2C)

Current Constellation

Space
AWACS   DSP
JSTARS   Global Hawk
Rivet Joint   U-2
ABCCC   Predator
Compass Call
E-4

Concept of Operations C2ISR Architecture Integrated Systems (Legacy & Future)

POC/Representative Capabilities

COMM

UAVs
GTACs   UCAV
SBR   SBIRS
AOC   MC2A
DCGS

NETWORK

Achieving Predictive Battlespace Awareness Machine-to-Machine Interfaces

Decision Quality Information

Integrated Capability

GMTI AMTI ELINT COMINT MASINT IMINT HUMINT BMC3
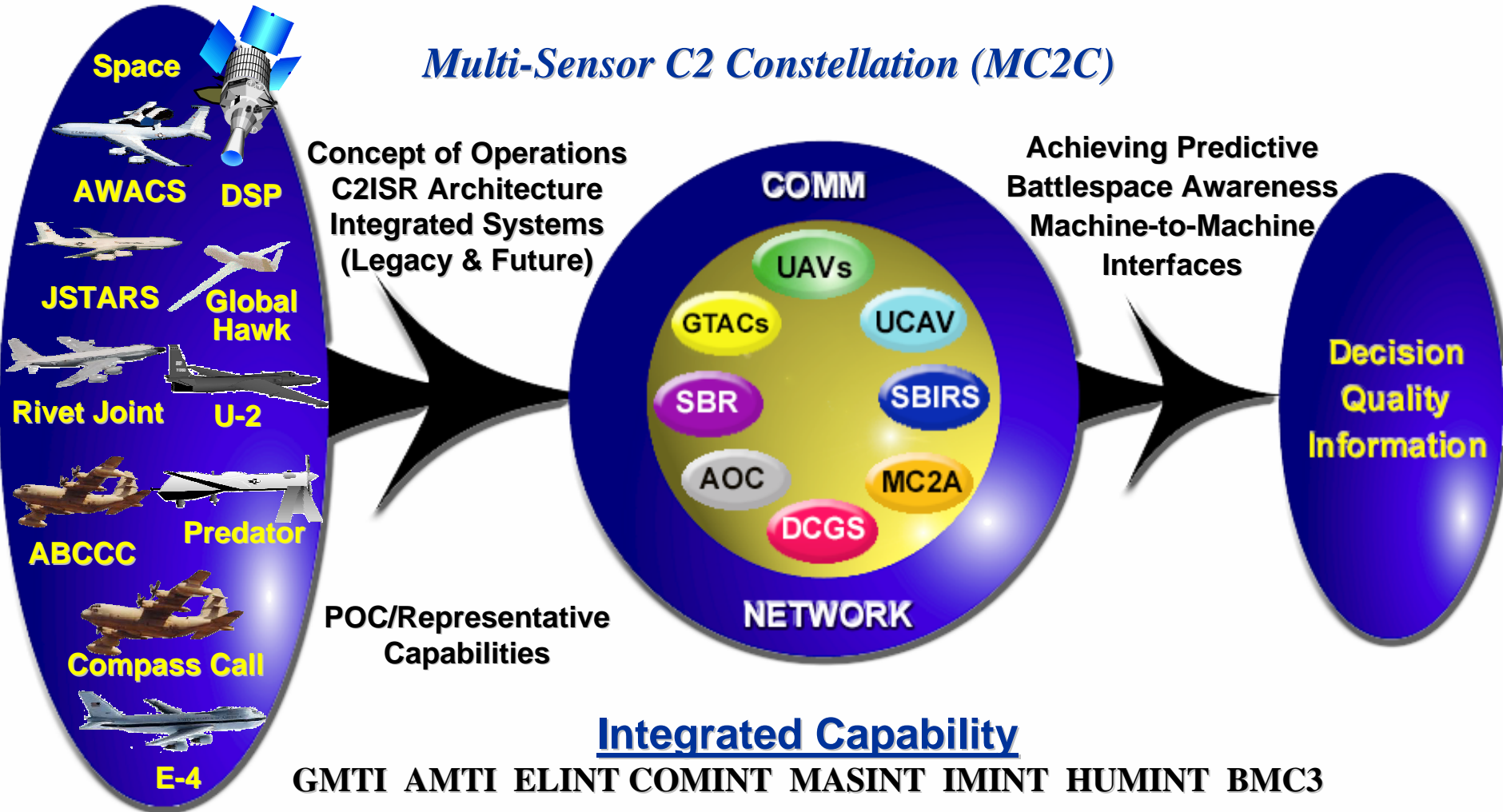
Architectures, System of System Engineering, to Achieve Interoperability Across Service, Agency, Joint, Coalition Systems Enabling Integrated & Interoperable Warfighting Capabilities

Focus on Warfighter Outcomes

- ***All** encompassing Horizontal/Vertical Integration Interoperable*
- ***Network** centric*
- ***Bandwidth** on demand*
- ***Machine-to-Machine** Dialog*
- ***Near** zero latency*
- ***Onboard** control and product exploitation*
- ***Functionality** to prosecute time sensitive targets*
- ***Open** systems architecture*
- **Joint/Coalition** Interoperable

Networked Collaboration

Horizontally & Vertically Integrated Multi-Spectrum Coverage

Robust Time Critical Targeting

Global Battlespace Visualization

Dynamic Engagement Control

Family-of-Systems Approach for Air/Space/Ground & Manned/Unmanned

Addresses Operational Deficiencies Today!

Task Force Focus
"CONOPS-Driven Roadmaps"

Global Power

Global Reach

Global Vigilance

EAF Construct With 10 AEF's

AIR FORCE CONOPS 2020

Air & Space Expeditionary Forces CONOPS

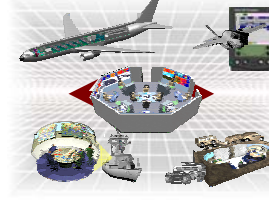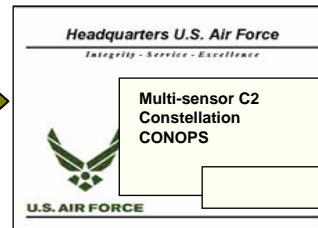| Global Strike Task Force CONOPS (Anti-Access)	Homeland Security Task Force CONOPS	Global Mobility Task Force CONOPS	Global Response Task Force CONOPS (Anti-Terrorism)	Nuclear Response Task Force CONOPS	Space C2ISR Task Force CONOPS

*C4ISR Is An **Enabler** For All Task Forces*

Capability-Focused Planning and Assessment Process

Task Force CONOPS

GSTF CONOPS 2002

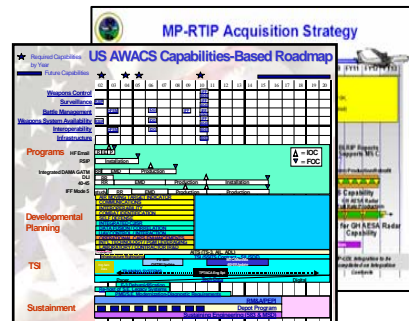AIR FORCE CONOPS 2020

- *Air & Space Expeditionary Task Force*
- *Global Strike Task Force*
- *Homeland Security Task Force*
- *Global Mobility Task Force*
- *Nuclear Response Task Force*
- *Global Response (Anti-Terrorism) Task Force*
- *Air & Space/C4ISR Task Force*

MC2C CONOPS

Multi-sensor C2 Constellation CONOPS

MC2C Architecture: Ops/System/Technical

MTW Ops Schematic MC2A with GMTI/BM
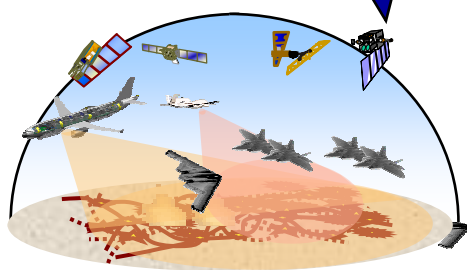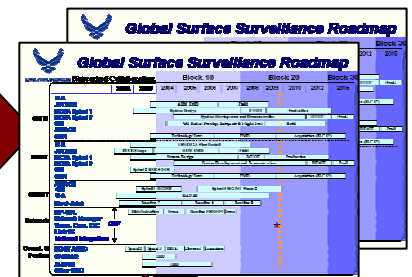
CONOPS & Architecture Assessments Supported by Distributed Networked Facilities And Advanced Simulation Environments

Integrated Capabilities


Program Roadmaps

Integrated Investment Roadmaps

Capability Roadmaps

MC2C Focus Areas

- **Systems Engineering and Architecture** – *Industry Teaming*
    - **Provides the Ops, System and Technical views and analysis/roadmaps**
    - **Guides the investment of C4ISR efforts**

- **Infrastructure**
    - **Network across government-industry facilities and aircraft (JDEP)**
    - **Common modeling and simulation architecture (JSB)**
    - **Diamond Matrix extensions**

- **Horizontal Integration Enablers**
    - **Vetted, lucrative near-term initiatives that demonstrate military utility and cut across system, funding, and/or organizational boundaries**
    - **Such as:**
        - **Network Centric Collaborative Targeting Integration**
        - **Air-Space C2 Integration**
        - **Enhanced BMC3 Functions (ISR Manager)**
        - **Data Link Infrastructure-Improved UAV Control**
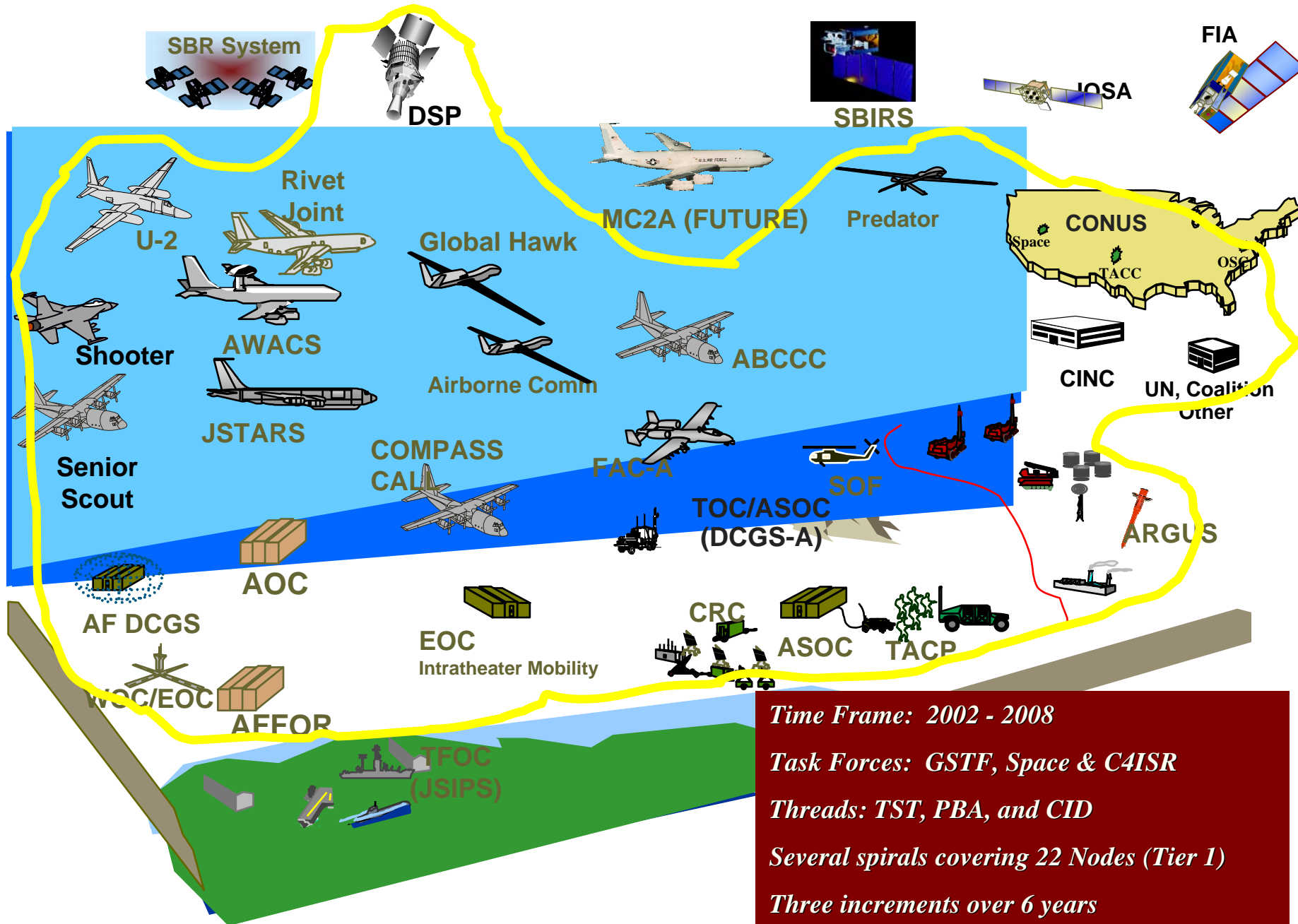   - **Communication projects**

Modeling & Sim (JSB) for C4ISR
Government – Industry Partnership
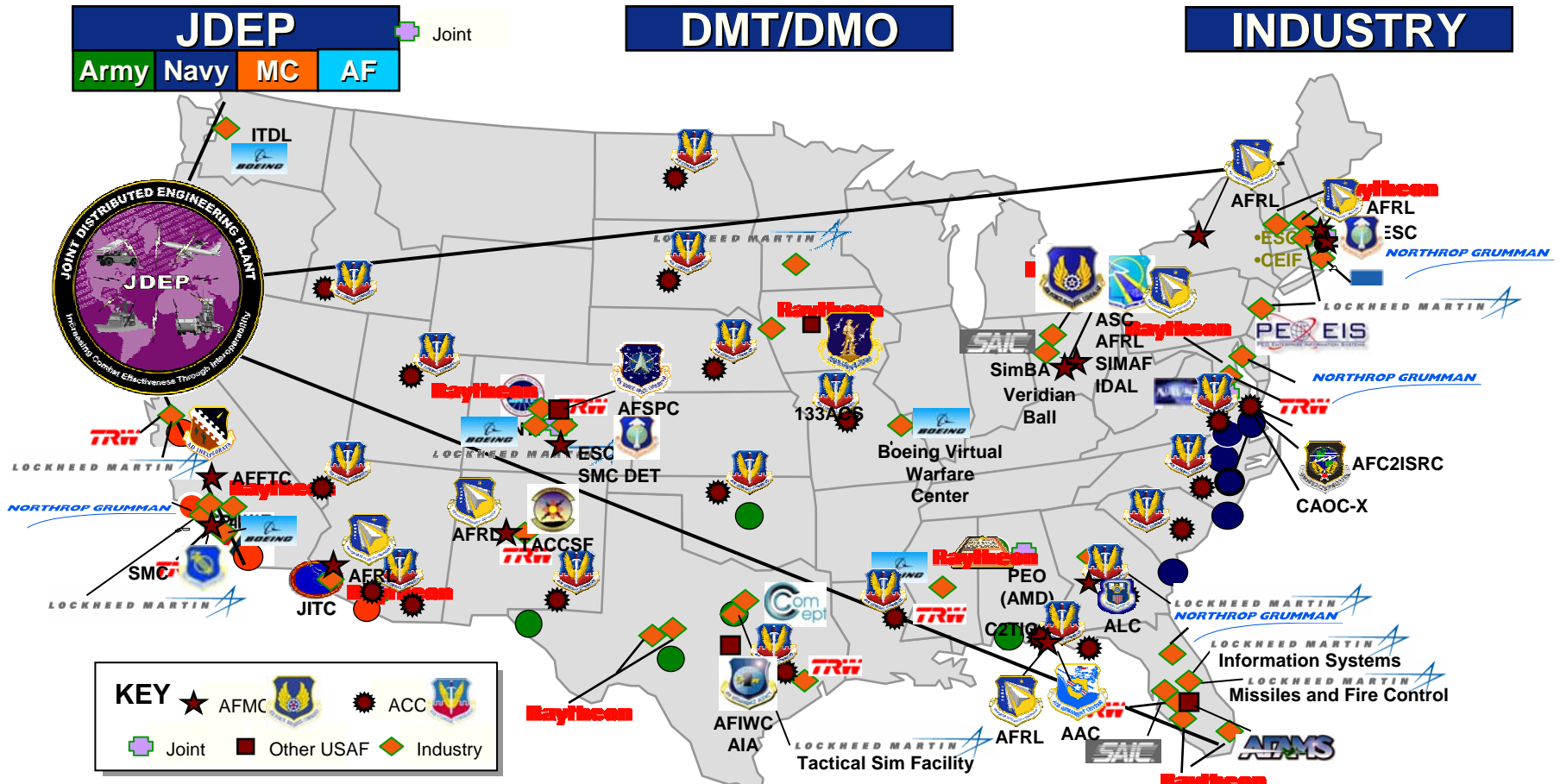
A Scalable National Resource of Facilities Enabled by a Common Simulation Architecture

Near Term Scope: MC2C Nodes

SBR System

DSP

SBIRS

FIA

IOSA

Rivet Joint

MC2A (FUTURE)

Predator

CONUS

Space

TACC

OSS

U-2

Global Hawk

AWACS

Shooter

ABCCC

CINC

UN, Coalition Other

Airborne Comm

JSTARS

Senior Scout

COMPASS CAL

FAC-A

SOF

TOC/ASOC (DCGS-A)

ARGUS

AOC

AF DCGS

CRC

EOC
Intratheater Mobility

ASOC

TACP

WOC/EOC

AFFOR

TFOC (JSIPS)

Time Frame: 2002 - 2008

Task Forces: GSTF, Space & C4ISR

Threads: TST, PBA, and CID

*Several spirals covering 22 Nodes (Tier 1)*

Three increments over 6 years

MC2C Issues

- **FY03 Congressional language**
    - **Unconstrained horizontal integration activities**
    - **FY03 funding status determines scope of effort and acquisition strategy**
    - **Paul Revere Testbed funding in FY03/04**
- **FY04 & beyond - No programmed funding**
- **Joint horizontal integration activities lacking focus**
    - **Each service active in integration program(s)**
    - **Potential way-ahead using operational architectures**

Summary

- **C4ISR Enterprise Integration is Working**
  - **MC2C Focus is Complementary – Leads the Way!**
- **Air Force seriously committed to new approach**
  - **Effects-based acquisition and fielding of integrated C4ISR capabilities**
  - **Organizational adjustments occurring at every level : Air Staff, MAJCOMs, ESC, CX**
- **Expanding Partnerships across C4ISR**
  - **AFMC and Air Force-Wide Effort**
  - **Links to Joint & Coalition**
  - **Links to Industry and Other Government & Academia Agencies**
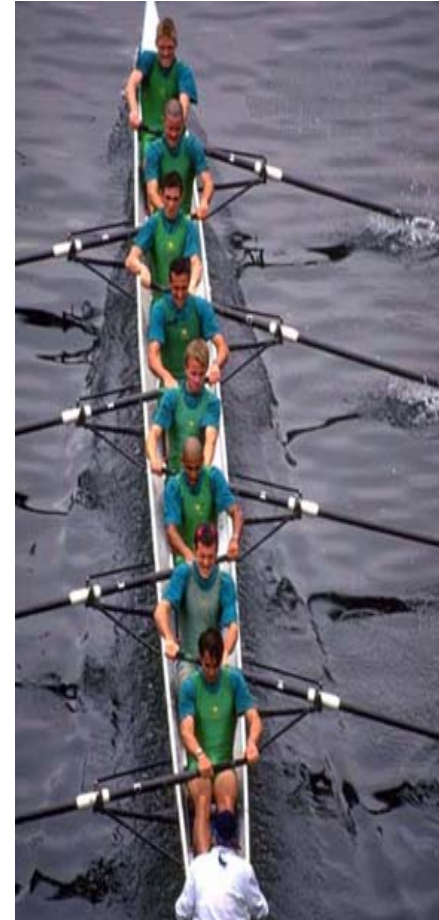
Enterprise Integration is a TEAM effort!